COST *and* MANAGEMENT

THE OFFICIAL JOURNAL OF

THE CANADIAN SOCIETY OF

COST ACCOUNTANTS & INDUSTRIAL ENGINEERS

Telephone 2 - 0700

INCORPORATED 1920

HEADQUARTERS. 601-602 MACKAY BUILDING,

66 KING STREET EAST, HAMILTON

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Vol. XIX FEBRUARY, 1945 No. 2

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Subscription price to non-members, $5 a year. Single copies 50 cents. Members desiring 5 copies or more of a single issue may obtain them at 25 cents each.

EDITORIAL

Returning Service Men

On January 17, 1945, the Reinstatement Regulations were given Royal assent in an endeavour to clarify certain aspects of the Reinstatement in Civil Employment Act, 1942. It attempts to define responsibilities of employers to those who left their employ to serve in the armed forces and who now seek reinstatement. The scope of such legislation at best is somewhat limited insofar as its true purpose is concerned, for responsibilities of one to another are not easily definable, particularly when it becomes a question of enforcing a moral obligation.

These regulations attempt to establish an employer's obligation under certain ambiguous conditions such as the physical and mental condition of the applicant, and the length of time required to apply for reinstatement. It is true that the Act and the Reinstatement Regulations will adequately cover the majority of older men who were well established in their positions at the time of enlistment, but it does not give consideration to the younger men who were just beginning to take their place in the organization. These young men left their jobs young in mind, and quite willing to be guided by others into the ways of established procedures. They will return matured in mind far in advance of their increase in years. It is not reasonable to suppose they will be willing to pick up where they left off five years ago, for they could not even if they would. Five years is a long time in a young man's life, and his steps cannot easily be retraced. Some of them, whose aggressiveness and abilities of leadership have been recognized and rewarded by promotion, have assumed positions of authority, and they will rightfully expect an opportunity to make use of this accomplishment in peaceful pursuits.

It is, therefore, not just a matter of offering these men their old positions, but rather each one must, individually, be given serious consideration, for it is an obligation of the employer to give returned men not only employment, but employment in which he is going to be happy. Much thought should be given to this problem by individuals and organizations alike. It may well be that an employer cannot provide the employment which will result in mutual satisfaction, but this may be accomplished by working with other employers through various business organizations.

It has been felt that one answer to such a problem is to provide the means whereby returned service men may set up in business for themselves. The government is encouraging this step in providing grants for such a purpose. Much advice and encouragement has been given by various writers. It must be remembered, however, that the funds provided are not public funds but rather, merely advances against the service man's re-

habilitation credit and there is no easier way to lose money than to start up in a business only to have it become a failure. It requires a man of certain definite qualities to make a success of a competitive business enterprise. A service man would be well advised to consider this step very carefully before he risks the benefits for which he has had to give up 5 years of his life.

The least which can be done for returning service men is to enable them, by whatever means possible, to become re-established in suitable positions or in businesses where they are going to be reasonably sure of security and happiness. This can only be partially enforced by legislation. The rest is up to the individual and his recognition of his responsibilities to his fellow man.

Study Groups

In a number of Chapters, efforts have been made to organize study groups for the student members who are working on the Society's course. In Vancouver, Kitchener and Hamilton these study groups are now functioning very successfully.

The value that can be derived from attending study groups should not be under estimated by those who are preparing for the examinations. The meetings provide an opportunity for discussing with other students, under the direction of a senior member the various problems which arise in the lessons. Those who take part in these meetings find that their course is infinitely more interesting, and progress is much faster. The time for examinations is rapidly approaching, and students would be well advised to take full advantage of these study groups, and of the assistance which can be given by the senior members.

Study groups are conducted by the student body of each Chapter and the meetings are held weekly. It is strongly suggested that such classes be organized in those Chapters where they are not already in operation. It provides a real opportunity for the students and stimulates interest in the Chapter as a whole.

Examination Dates

Dates set for examinations are as follows:

Monday, April 30th—Accounting I.
Tuesday, May 1st—Fundamentals of Cost Accounting.
Wednesday, May 3rd—Accounting II.
Thursday, May 4th—Advanced Cost Accounting.
Friday, May 5th—Industrial Organization and Management.

Candidates are advised that applications to sit for these examinations must be made on the prescribed form, obtainable from the Secretary, and that applications should be entered by April 1st, next, and be accompanied by the prescribed fee. Members of the Cost and Management Institute should obtain forms from R. Herron, 1201 The Royal Bank Building, Montreal, Que. All others can obtain forms from the Dominion Secretary.

Chapter Notes

Bay of Quinte

The Chapter has been very fortunate in securing for its meeting on February 27th, Mr. H. E. Yardley, Systems Manager of Ernst and Ernst, Toronto. Mr. Yardley will speak on the subject, "Planning for Post-War Standard Costs and Expense Control."

Edmonton

The regular monthly meeting of the Chapter was held January 12th at the Corona Hotel. The meeting was addressed by Mr. C. L. King, C.A., in accounting, University of Alberta. This was the sixth lecture in a series of 12 which have been arranged by the local Chapter with the University of Alberta. The meetings have been well attended and the members are deriving much benefit from them.

Mr. King's subject was "Depreciation" and the discussion covered the theory behind depreciation and obsolescence, the nature of physical and functional depreciation and the various methods used.

Fort William-Port Arthur

Mr. H. N. Bickmore, R.I.A., was the speaker at the meeting of the Chapter held on January 25th in the Prince Arthur Hotel. Mr. Bickmore spoke on the subject of inventories and dealt with some of the methods of taking inventories, systems of pricing currently in vogue and the numerous pitfalls to watch. The speaker revealed a trend in larger industries to entirely close down for a period so that an accurate inventory can be taken.

Hamilton

On January 18th, the Chapter acted as hosts to thirty members of the Toronto Chapter at the Royal Connaught Hotel. The speaker of the evening was Mr. W. J. McCulloch, Managing Secretary of the Hamilton Chamber of Commerce. The subject chosen was "Let's Hold Onto Him" which did not mean a great deal until the speaker let it be known he referred to none other than Winston Churchill. Mr. McCulloch spoke in reply to criticism levelled at the British Prime Minister by certain individuals, notably H. G. Wells. The speaker not only revealed himself to be possessed of great eloquence and dynamic speech but of more than a passing knowledge of the capabilities of Mr. Churchill as a leader and the short comings of Mr. Wells as a prophet. His speech was most enthusiastically received and enjoyed by all.

A lively entertainment program was provided by William Baillie but unfortunately the Toronto members had to leave early to catch the train.

The meeting was under the direction of Mr. R. J. Menary, R.I.A., Chairman of the Chapter.

The next meeting of the Chapter will be held February 15th at the Royal Connaught Hotel and will be addressed by Mr. G. M. Walker, R.I.A., Cost Accountant, Sheldon's Ltd., Galt, Ontario.

Montreal

The meeting of January 26th was very well attended by members and friends of the Institute. The speaker was Mr. Alan Herrgan, Manager, Manufacturing Methods Division, R.C.A. Victor Co. Limited. The subject of the address was "Work Simplification, Why and How."

The Dawson Memorial Fund of the Institute reported that they have surpassed their objective for this fund. The committee was under the chairmanship of Mr. E. J. Loiselle, L.C.M.I.

Niagara District

On Jnuary 17th, the Chapter held its regular meeting to hear an address by Paul Pratt, District Sales Manager of the Remington Rand Ltd., Toronto. Mr. Pratt soke on the subject, "Accounting by Tabulation". The address, which proved to be most successful, was supported with illustrations of the different types of machines and samples of punch cards. The attendance numbered 45 of which 13 were ladies.

On January 31st, the Chapter held an "Accountant's Quiz" for which two teams were selected. The questions comprised both cost and general accounting. Four very nice prizes were donated by various members for individuals answering correctly the greatest number of questions.

On February 21, there is scheduled a joint meeting with the Buffalo Chapter of the N.A.C.A. which will be held at Niagara Falls. The speaker will be Mr. A. E. Grover, Past President of the Cleveland Chapter of the N.A.C.A. Mr. Grover is Senior Cost Systematizer of Thomson Aircraft Products Company, Cleveland, Ohio.

Ottawa

The Chapter will hold a meeting at the Chateau Laurier on February 21st, 1945. The Speaker will be the president of the Ontario Society, Mr. H. M. Hetherington, R.I.A., who will speak on the subject: "Some Vital Problems in Postwar Planning and Finance."

Quebec

On January 10th, the Chapter held a joint meeting with the C.G.A.'s. The speaker was Mr. W. H. Evans, Secretary-Manager of the National Office Management Association of Philadelphia. Mr. Evans spoke on the subject "The Development of Office Management."

The meeting was of unusual interest an dwas attended by a large number of members of both associations.

Vancouver

In spite of a street car strike, the Chapter had its largest attendance of the year at its meeting on January 11th. The speaker was one of our own members, Mr. F. G. Coburn, District Supervisor, Treasury-Cost Division, Dept. of Munitions and Supply. The subject of his address was "Controlled Job Costs" and proved to be of great interest to the members.

The local Chapter has been very forunate in drawing on its own members for speakers. Mr. N. Hartley, of the Powell River Co. of Powell River, B.C., will speak in February on the subject. "Budget Costs" and Mr. K. Orr will speak to the Chapter in March.

Windsor

A most interesting and enjoyable meeting of the Chapter was held on January 25th at the Norton-Palmer Hotel. The meeting was under the direction of the Chairman, Mr. J. B. Tennant, R.I.A. The speaker of the evening was the President of the Society of Industrial & Cost Accountants of Ontario, Mr. H. M. Hetherington, R.I.A., who spoke on the subject, "Where the Money Comes From in Business." In the course of his address,

the speaker touched on the various aspects of company financing and credit. The interest in the talk was evidenced by the lively discussion which followed.

In addition to his role as speaker of the evening, Mr. Hetherington was called upon to introduce the newly appointed Secretary-Manager of the Canadian Society of Cost Accountants and Industrial Engineers, Mr. J. N. Allan, R.I.A., and also to present a certificate of Registered Membership to the Secretary of the local Chapter, Mr. E. R. McGee, R.I.A.

The next meeting of the Chapter will be held on February 22nd at the Norton-Palmer Hotel and will be addressed by Mr. G. Thompson on the subject, "Law of Contracts."

New Members

Calgary

F. S. Holmes, Alberta Hail Insurance Board, Calgary.

Edmonton.

T. W. A. Jewett, Dominion Income Tax, Edmonton.
M. G. Gerbach, Pavey Candies Ltd., Edmonton.

Fort William-Port Arthur.

N. W. Cressman, Leitch Gold Mines Ltd., Beardmore, Ont.

Kitchener

David P. Garibaldi, Dominion Woollens & Worsteds Ltd., Hespeler.

Montreal

Henry F. Young, Aluminum Co. of Canada Ltd., Montreal.
S. J. Closner, Canadian Vickers Ltd., Cartierville.
W. Holmes, Howard Smith Paper Mills Ltd., Montreal.
J. E. Munro, P. S. Ross & Sons, Montreal.

Niagara

Joseph Cockburn, Foster Wheeler Ltd., St. Catharines.

Vancouver

C. J. Hutchinson, Boeing Aircraft of Canada Ltd., Vancouver.
John O'C. Oldfin, Commonwealth Construction Co., Vancouver.
J. Earle Nelson, 106 52nd Ave., E., Vancouver.
William Wyllie, 3025 39th Avenue W., Vancouver.
R. C. Girling, Canadian Canners Ltd., Vancouver.
G. F. Hogarth, 2020 Barclay St., Vancouver (transfer from Toronto Chapter).

Windsor

Edward A. Parker, The Canadian Bridge Company, Limited.

Non-Resident

Pte. T. Kottick, On Active Service with Canadian Army.
Lieut. J. W. Dodds, On Active Service with Canadian Army.

Current Literature Review

Machine Assignment

An article entitled "Figuring Most Economical Machine Assignment", prepared by Wm. Weir, Supervisor, Methods Engineer, Aluminum Co. of America, has been published in the December, 1944, issue of "Factory Management & Maintenance."

The exigencies of war have introduced many new types of automatic machines which have rendered obsolete a large number of semi-automatic or hand operated machines. This brings to greater importance than ever before, the problem of how many machines should be assigned to one person or group of persons.

The author introduces a formula for determining the most economical number of machines per operator under certain given conditions and illustrates the graphical solution of the formula. It is a method worthy of consideration by any one who has to contend with machine assignments.

Cost Accounting for a Farm

Farming has been possibly the most reticient of all industries to utilize modern accounting methods. Even in this industry, however, it has become apparent that accurate accounting records are becoming essential if operations are to be conducted on a profitable basis.

In the "Accountant's Magazine", December, 1944, is published an article "Farm Cost Accountants", by J. A. Stodart. This article is based on the experience of the author in operating a 450 acre farm. He has illustrated that setting up a cost system for a farm is entirely practical and logical in spite of the many opinions to the contrary, and that the results more than justify the time and effort required to maintain the necessary records.

Profit Sharing Plan

In an endeavor to promote closer association between management and labour many attempts have been made to introduce a plan of sharing profits with employees.

In the N.A.C.A. Bulletin of January 1, 1945, is published an article entitled "An Overall Profit Sharing Plan With Incentive Aspects" by Keith W. Dunn. The author points out some of the weaknesses in plans which have been attempted and the reasons why such plans are not carried through to a successfully operating project.

The plan suggested is applicable to any business assuming that labour, management and capital are considered as partners and that all three are entitled to a share in excess profits after a basic compensation for each. In the operation of such a plan, the author has dealt with such problems as overtime, basic compensation, tie-up with wage incentives and what profits should be available for distribution.

Financial Accounting and Cost Accounting

In the December issue of the "Federal Accountant", published by the Federal Institute of Accountants, Australia, is printed a report on "The Need for Applied Accountancy". This report was submitted to the

Institute of Industrial Management, South Australia, by K. H. Thomas, A.F.I.A., A.C.A.A.

It is all too often the case, that the General Accountant and the Cost Accountant work independently of each other to their own particular ends, and thereby deprive management of controls, from which they might otherwise benefit. In this report is presented the present trends in general and cost accounting practices and the need for collaboration between the two to provide a proper guide to economic industrial management. It is an article of timely interest to both General and Cost Accountants.

Cancellation or Termination of Contracts and Renegotiation

By WILLIAM P. PAYNE
Director, War Contracts Division
Chrysler Corporation of Canada Limited
Windsor, Ontario.

Address to The Windsor Chapter of the Society of Industrial and Cost Accountants of Ontario, December 15, 1944

Perhaps it would be well for me to begin by qualifying my remarks to the facts as they are known to-day and opinions expressed must be construed as my own and do not reflect the opinion of any government agency or the Chrysler Corporation.

Cancellation or Termination of Contracts

1) Cancelled Contract

A cancelled contract is interpreted as an executed contract where some steps have been taken toward first production at which point it is desirable to cancel all activities.

2) Terminated Contract

A termination takes place when a contract has developed to the point where shipments of the finished article have commenced and then it is desirable to terminate the contract prior to completion of the total number of units provided for in the contract. Whether it is cancellation or termination the contractor's problems are similar.

Consolidated Contracts for Claims

The contractor may have many contracts for similar goods that may be all cancelled or terminated at one time. Such contracts probably involve many sub-contractors and suppliers or vendors as well as the prime contractor. Therefore, recently at the request of industry, two orders in council have been passed which allows the government to deal with claims of contracts cancelled or terminated on an individual or consolidated contract basis and also allows the government to deal with subcontractors direct when it is desirable rather than through the prime contractor.

Time Required for Finalization

1) One of the early contracts terminated required 16 months for finalization whereas to-day it is thought the same contract could be finalized in

three months. Recently a general contractor compiled a hypothetical termination to procure answers to the many problems in an endeavour to shorten the time required for finalization.

2) The delay in completing contracts terminated is as much, if not more, chargeable to the contractor than to the government, although many revisions of government procedure, changes in staff, temporary government employees, transfer of government administrative responsibilities form one department to another, add to the delays involved.

First Steps in Cancellation or Termination

1) Usually cancellation or termination is first made known to you by an officer of the government phoning to the effect that the supply is no longer required and such information is being given to you in advance by phone in order that you may prepare for the adjustment in your operations.

2) Recently government procedure provides for the procurement of certain data prior to which time termination does not take place. This involves production facts, labour involved and so forth.

Problems in Cancellation or Termination

The subject of cancellation or termination can rightfully be divided into two problems:

1) Financial
2) Physical

The financial problem can be delayed without tieing up a business, provided capital is such as to allow, but the physical or stock problem must keep moving at all times unless the labour situation is to become more disturbed with loss of production. However, physical movement of material is dependent upon financial decisions and, therefore, the two problems are very closely dependent one on the other.

Steps Taken After Notice of Cancellation or Termination—Financial

1) **Review** — When the government first notifies you a cancellation is coming it is most important that a quick and accurate review of your position be made as decisions will be based on such review which will affect such cancellation until the contract is finally completed. As an example, it may be better judgment to produce additional units even though it appears they will not be required than to come back into production on the same article six months later.

2) **Prepare Claim** — When effective points of cancellation have been finalized it is necessary to quickly, yet accurately, prepare a claim upon the government against your contract representing costs involved that cannot be salvaged. This also involves your supplies. While there may be hundreds of accounts involved in one prime contract it only takes delay by one or two of your suppliers to hold up your claim. This often happens if their records are not adequate and accurate. In such cases, it is more practical to submit an interim claim pending finalizatiton of such accounts. The importance of accurate records in this regard, whether they be purchasing, planning or particularly costs, cannot be too greatly stressed.

3) **Take Inventory** — In most of the articles to date we are advised our first move on cancellation should be to stop and take an inventory, such an inventory to be used as a basis for your claim. In my opinion, the

first move should be to take an inventory of the items of no use to you in your normal production, in other words how much of your inventory can you use without disrupting normal production. My reason for this is based on the fact that you have materials on hand that can be used in your normal production. If you include such items in your claim it will necessitate ordering new materials which will take more time to procure from your sources and perhaps the cost may be higher.

4) **Use of Forms** — Once you know the materials you cannot use then your regular inventory operation follows through to your pricing, etc., on the forms established for this purpose by the government. Such forms will segregate materials by classes.

5) **Filing Submission** — The prime contractor now has authority to settle claims with you when he is satisfied such claims are fair and reasonable, subject to a review by the government. When such claims are incorporated into the prime contractor's submission, the submission is filed with the new Contract Submission Board, headed by Mr. W. Williams of Toronto with Mr. Methias as the secretary.

6) **Final Steps** —

1) When your claims have been reviewed by this board they are passed to the contracts branch with instructions for settlement.

2) Assuming that both are in agreement, the contract is amended.

3) The contractor issues an invoice on the amended basis and as far as the financial end goes your contract is finalized.

Steps Taken After Notice of Cancellation or Termination — Physical

1) We have, as yet, to deal with the physical movement of the stock. This is covered by submitting unpriced copies of your claim which includes your inventory, to your production director general, at the same time you submit your claim to the settlements board.

2) The director general will review the claim and determine if the materials can be used for any other contract or by any other branch of the government or any foreign country, or, for that matter, any other purpose.

3) When it is finally determined that such materials are of no further use they are passed to the chairman of the M. & S. production committee. This committee covers all the director generals and if it is agreed here that such materials are of no further use to the government, title passes to the War Assets Limited for disposition of the materials on the recommendations of the Crown Assets Allocation Committee.

4) While these various manoeuvres are taking place the physical problem perhaps cannot stand still so plans to move such materials into storage pending final disposition will have to be arranged.

Summary

It is not my opinion this is the ultimate goal and method of disposition of materials left at time of cancellation. This subject is presently being given a great deal of consideration by the government. Committees have been formed in the various industries for the express purpose of making recommendations to the government on the methods to be used of disposing of such surplus materials.

It is to be hoped a method will be arrived at for disposition of such materials, such as recently has been brought into the picture in the U.S.

program where they, to a great extent, endeavour to predetermine disposition, in other words, arrive at the disposition by an analysis of the materials involved prior to cancellation.

1) **Contract Renegotiation**

Contract renegotiation might be called the cancellation of a contract and the writing of a new contract. The differences between the original and the rewritten or the new contract would represent the renegotiation provisions of contracts. I believe the term "Contract Renegotiation" represents a little more than this as renegotiation is much more commonly applied to the renegotiation of the financial provisions of a contract. In other words, the common impression of contract renegotiation is the government reviews the financial performance of your contract and changes the profit to the contractor.

2) **Authority for Renegotiation**

A) Section 13 of the M. & S. Act which was passed in April, 1940, provides for fair and reasonable profit in government contracts to the satisfaction of the minister of M. & S.

B) Most munitions contracts specify the exact profit.

C) General provisions of any government purchase provides authority for the auditor general to audit such purchases and endeavour to reclaim excess profit.

D) When the war started an audit provision called M. & S. 433 was written and is included in practically all forms of government contracts and also applies to subcontracts.

3) **Types of Contracts**

A) **Target Price** — Generally used with a new major item — no previous experience, such as guns.

B) **Cost Plus** — Generally applied to construction with the use of a resident auditor.

C) **Specific Unit Profit With a Bonus Clause** — Such as tanks.

D) **Management Fee** — Crown Company.

E) **Ceiling Price** — Voluminous contracts.

F) **Firm Price** — This is the type of contract with which we are all familiar. Here you tender and are given business on your fixed price. The firm price contract lends itself to competition and, therefore, has a varying profit return. For the purpose of this address we will talk only on firm price contracts as it is probably the one most common in use.

4) **Procedure of Renegotiation**

A) Negotiation and administration of contracts is the responsibility of the negotiation officers of Q.M. and S. with the legal form and the text being provided by the legal department of M. & S.

B) We arrive now at the point where we have a firm price type of contract, handled by the contracting officers of the department of M. & S. We have shown the authority for renegotiation and audit and the results of the audit leading the negotiating officers to the conclusion that you have made excessive profit on a given contract and it is desirable to "renegotiate" you.

C) If you were in this position you would likely receive a letter from the contracts officer to the effect that they would like to have you

present all the relevant cost factors and come down and see them, at which time you would be asked to discuss a revised price on forward business.

D) This would have the effect of bringing your sales for such forward business down to a profit considered by the manufacturer's representative and the contracts officer to be fair and reasonable. After you repeat this performance a few times the matter of prices settles so that you are in a relatively fair and reasonable profit position.

E) Once current contracts have been renegotiated a review might be made of the profits from completed business. If it were thought desirable the contracting officers might suggest to you the return of funds in excess of the figure agreed upon between the two contracting parties as fair and reasonable profit on past business from which higher profits had been obtained.

5) **What is a Fair and Reasonable Profit?**

A) As provided for in the contract proper.

B) A figure which will, with the increased volume, return to the contractor approximately his normal profit.

C) As determined by the minister through his designated representatives.

D) The most prevelant rate is 5% of net cost of sales established with the audit form.

6) **Alternative if a Contractor Disagrees on Fair and Reasonable Profit**

The M. & S. Act provides if a contractor disagrees with the minister or his representative in the matter of fair and reasonable profit he has the prerogative of presenting his case to the exchequer court. To date, this has been required in very few exceptions, as in most cases when looked at reasonably amicable agreements are usually the result.

7) **Summary**

This briefly summarizes the matter of renegotiating a contract. I have not endeavoured to cover any of the multiple details involved but would comment that adequate and accurate records, kept up to date at all times, supported by an experienced clerical staff, is of the greatest importance in working with M. & S. contracts.

BURROUGHS LEADS . . . .

in helping when war accounting problems arise

In war industries, camps, depots, bases and government offices, Burroughs systems and installation men have been working with officers and executives, devising modern machine systems to save accounting time and clerical manpower.

Burroughs men — thoroughly experienced in meeting all types of accounting problems — know how the speed and efficiency of figuring and accounting machines are best applied to this work.

It is gratifying to know that Burroughs' experienced technical staff has been able to make such an important contribution to the war effort.

BURROUGHS ADDING MACHINE OF CANADA, LIMITED

Windsor, Ontario

Cost Accounting in the Canning Industry

With Special Reference to Tomato Products

By OMER W. COX, A.C.I.S.

Part II

Daily Raw Tomato Usage Statement

Total Absolute Pounds—From the daily pack report is entered the cases packed of each item. The number of cases packed of tomatoes and juice by sizes multiplied by the respective absolute pounds per case gives the total absolute pounds used per item that day. This method is used for tomatoes and juice because there is very little variance in the weight of raw tomatoes which actually goes into the can. For practical purposes the raw tomatoes going into these two products are in their original state as regards specific gravity. Soup and puree, however, present a different problem, since the raw tomatoes are boiled down into a thick pulpy mass. The number of pounds of raw tomatoes required for a 105-ounce can of puree is several times that required for tomatoes. For these two products the number of starting gallons for each batch boiled down is known. A standard number of pounds per starting gallon has been set, which when multiplied by the total starting gallons gives the absolute pounds of raw tomatoes for that batch. The daily pulp department report gives the particulars required for soup and puree, which have a different specific gravity in the finished product.

Usage Computation—The daily tally of raw tomatoes received and the inventory report of baskets of tomatoes on hand at the end of the day's pack give the information necessary to compute the daily usage of raw tomatoes, as illustrated at the bottom of Exhibit 8. For both number of baskets and total pounds, the on hand at start added to the receipts, less the on hand at end of day gives the total usage.

Proration of Tomato Usage—The absolute pounds of raw tomatoes per product is used in prorating the total actual usage over the items packed that day. As illustrated in Exhibit 8 let us assume a grand total absolute usage of 484,000 pounds, a grand total actual usage of 650,000 pounds, and an absolute usage of 30,000 pounds for 20-ounce tomato juice. The actual usage for this item is computed as follows:

$$\frac{650{,}000}{484{,}000} = 1.34 \times 30{,}000 = 40{,}289 \text{ pounds}$$

This method of allocating wastage to products is based on the assumption that the wastage is incurred by each product uniformly on the basis of absolute usage. This assumption is very close to the actual conditions. In tomatoes we remove the skin and stem end but leave the seeds in; in tomato juice we remove the seeds, peelings, and any other inedible portions The latter also applies to soup and puree. There is not yet any practical way of allocating wastage directly to products, except uniform proration on absolute usage.

Usage Ratios—Since the standard pounds of raw tomatoes per case always bear a pre-determined relation to the absolute pounds per case, only

the absolute figures are shown in detail in the daily raw tomato report. The total actual usage of 650,000 pounds less the absolute usage of 484,000 pounds, as illustrated, gives an actual wastage of 166,000 pounds. The standard wastage computed at 50 per cent of absolute is 242,000 pounds. These figures result in a wastage ratio of actual to standard of 59%, which condition is met with only on days of ideal production conditions. The usage ratio of actual to absolute is computed by dividing the actual usage by the absolute usage, giving 134 per cent in the illustration. The usage ratio of actual to standard would be 90%. These several ratios aid management in evaluating the efficiency in the utilization of the purchased raw tomatoes used that day, and when anything gets out of line it will be reflected in these ratios, the cause of which can be investigated. As explained previously, many factors can influence raw tomato wastage. These ratios are computed on the grand total figures only.

Cumulative Raw Tomato Statement

At the end of each week a cumulative report reflecting the totals to date is prepared similar to the daily raw tomato report. This statement averages out fluctuating conditions from day to day, and shows the average state of affairs to date. It also forms the basis for charging raw produce usage of both pounds and dollars by product in the cost ledger and further by size in the supplementary cost statements. Entries are also made in the general books reflecting totals only.

The actual pounds prorated of raw tomatoes used in the various products are multiplied by the respective standard differential product costs per pound to get the total cost of tomatoes for each product. The grand total differential cost of all products is compared with the total standard average cost obtained by multiplying the total pounds by the flat price per pound. The ratio standard average to the standard differential cost gives the variance ratio due to pricing at the differential cost per pound, and is an index, when taken on a cumulative basis to even out daily fluctuations, of the accuracy with which the pack estimate has been made and the resultant differential raw produce prices per pound. This ratio computation is illustrated below.

$$\frac{\text{Standard Differential Cost } 5019.42}{\text{Standard Average Cost } 5444.00} = 97\% \text{ Price Ratio}$$

The variance between actual and standard due to both quantity and price give useful information in dollars as illustrated in Exhibit 8.

Standard Value of standard quantity	5445.00
Standard Value of actual quantity	4875.00
Variance due to quantity (under)	$570.00
Standard differential cost of actual quantity	5019.42
Standard average cost of actual quantity	4875.00
Variance due to price differential	$144.42

CONTAINERS AND CONDIMENTS

Usage—No daily report of can usage is required as such, since the absolute usage is determined from the pack report each day. Outside of careless handling by employees, daily control on cans is not necessary.

Exhibit 8

Daily Raw Tomato Usage Statement

TOMATOES

Size	Absolute Pounds Per Case	Cases Packed	Total Absolute Pounds	Total Actual Pounds Prorated	Total Standard Cost of Actual Pounds	Total Actual Cost
15 ounce	43	1,000	43,000	57,748	545.14	529.46
28 ounce	44	3,000	132,000	177,273	1,673.46	1,625.31
105 ounce	40	1,000	40,000	53,719	507.10	492.51
Total Tomatoes		5,000	215,000	288,740		2,647.28

TOMATO JUICE

10 ounce	30	1,000	30,000	40,289	304.18	295.43
20 ounce	30	1,000	30,000	40,289	304.18	295.43
48 ounce	38	500	19,000	25,517	192.65	187.11
105 ounce	40	500	20,000	26,860	202,79	196.96
Total Tomato Juice		3,000	99,000	132.955		974.93

TOMATO SOUP

No. Batches Soup	20					
Total Starting Gals.	10,000					
Standard Pounds per Gallon	10					
Total Pounds to Soup			100,000	134,297	758.78	736.95
No. of Case Packed, 10 oz.		1,500				

TOMATO PUREE

No. Batches	10				
Total Starting Gallons	7,000				
Pounds per Gallon	10				
Total Pounds to Pulp			70,000	94,008	
No. of Cases Packed, 10 oz.		500			531.14	515.84
Grand Totals		10,000	484,000	650,000	5,019.42	4,875.00

Control Data

Actual Waste	166,000 lbs.
Standard Waste (50%)	242,000 lbs.
Standard Cost	$5445.00
Variance Due to Quantity (—)	570.00
Variance Due to Price	144.42
Waste Ratio (Actual to Std.)	59%
Usage Ratio (Actual to Abs.)	134%
Usage Ratio (Actual to Std.)	90%
Price Ratio (Actual to Std.)	97%

Differential Price Per Pound

Tomatoes	.00944
Tomato Juice	.00755
Tomato Soup	.00565
Tomato Puree	.00565
Weighted Average	.00750

Usage Computation

	Baskets	Pounds
Start of Day	5,000	150,000
Receipts	20,000	600,000
End of Day	4,000	100,000
Usage	21,000	650,000

There is a very small percentage of defective cans, and a small percentage of spoilage of cans in the production process. Can wastage and special usage occurs at several points, which are tabulated below; and is reported by the closing machine and Casing Departments daily.

1. Unloading from freight cars or jammed in can lines.
2. Filling and Closing machines.
3. Used for testing cans.
4. Samples cut at factory during pack.
5. Samples reserved for future regrading, etc.
6. Leaks, swells, and rusties detected and discarded before casing up.

Setting the Standards—The standard wastage is set for cans based on past performance and anticipated manufacturing conditions, and the standard usage per case is then easily determined. There are two steps in computing the standard cost per case. First the standard cost per 1000 cans is determined. This figure multiplied by the standard usage per case gives the standard cost per case for these elements, as illustrated in Exhibits 9 and 10.

Can Usage Statement—At the end of each month and the close of each pack a can usage statement is prepared as in Exhibit 11. This statement shows the actual cases packed to each product by can size subdivisions. The totals of each can size are shown for absolute can usage, which is the total cases multiplied by the number of cans per case. The inventory reduction is shown and the total wastage is the difference. The reported wastage is also listed and the difference between the actual and reported wastage taken for control purposes. The next column is the actual cost of the inventory reduction for each can size. The actual cost is prorated over the products packed in each size of can on the basis of the absolute can usage. The standard cost of actual can usage is computed by multiplying the standard cost per thousand cans by the actual can usage. This figure (column 9) subtracted from the actual cost (column 7) for each size gives the variance due to price. The total standard cost (column 10) subtracted from the standard cost of actual can usage (column 9) gives the variance due to quantity. The two variance columns total the difference between actual and standard, and indicate the deviation from standard by the two causes. The percentage wastage is an important control feature since the percentage above the standard wastage is that much in excess of standard and reveals excessive usage of cans.

Cartons

Shipping cartons are accounted for in precisely the same manner as cans. A statement similar to Exhibit 11 is also prepared for cartons since the same factors are at play as with cans.

Exhibit 9

Cans, Standard Cost per 1,000 (20 oz.)

Explanation	Standard Cost Per 1,000
Price, less discount, at can factory	28.75
Freight in	1.00
Standard Cost per 1,000	29.75

Exhibit 10

Cans, Standard Cost per Case

Size	Number Cans per Case Absolute	Number Cans per Case Standard	Standard Cost Per 1000	Standard Cost Per Case
10 oz.	48	48.48	18.00	.87264
15 oz.	48	48.48	21.00	1.01808
20 oz.	24	24.24	29.75	.72114
28 oz.	24	24.24	35.00	.84840
48 oz.	12	12.12	48.25	.58479
105 oz.	6	6.60	79.00	.52140

Condiments

A daily usage report which summarizes the daily recorded usages of all salt, sugar, other condiments, and other food items. These daily usage reports are summarized for each month. This report shows the units of each item going into each product separately, all sizes combined. It is impractical to follow the actual usage through each can size.

The principles explained under the usage of the other elements of direct material apply to condiments as well. In addition, we have the daily usage report. The actual usage is the inventory reduction over a period. Inventory disappearance between packs, however, is charged to factory overhead.

The absolute usage per batch is obtained from the formula, and an absolute usage per case of each element is determined. Added to this is the standard wastage arrived at by a study of past experience and anticipated changes in manufacturing conditions. The result is the standard usage per case for each size and each product.

These standards are used in judging the efficiency of handling the various elements, such as sugar, salt, etc. They are also used as relative costs, and the actual usage is distributed over the pack of the various sizes on the basis of the total standard cost. The methods followed are similar to those illustrated in Exhibit 11 illustrating cans, and for this reason condiment usage is not further shown.

DIRECT EXPENSE

In the canning industry direct expense plays an important part in costs, since so many items of expense can be charged directly to a given product. Such costs that are incurred for a specific pack and would not otherwise have been incurred, are properly a direct expense of the pack and are, therefore, treated as a direct cost. The shutdown expense together with repairs, maintenance, etc., are treated as indirect costs and apportioned with other overhead. For statistical and control purposes direct expense is broken down into several groups, which are discussed below.

Direct expense carries the same features as indirect expense, except that the former are identifiable with a given product. For this reason, the methods of determining the standard costs for direct expense are similar to those used in establishing factory departmental overhead. Past experience is the principal factor, coupled with a modification in the light of anticipated changes in manufacturing conditions and prices. For the budgeted pack of each product group, the estimated direct expense for each item

of direct expense is determined. Then the expense is broken down by variety first and further by size, being prorated on the basis of the pounds of raw produce required for the budgeted pack of each product item for each elemeit of direct expense.

Trucking Farm Produce—This element is really an additional cost of raw farm produce. Farm produce is usually bought on a contract basis at a fixed cost per unit for the entire pack. It is preferred by the industry to have the farm produce account show the cost of this element as paid to the grower. When there is an extra cost of hauling farm produce to the plant, it is charged to this account. This applies to perishable farm produce bought on contract only.

Direct Crop Expense—Most expenses of the crop department can be charged directly to a given product, and hence it is expedient to charge as much as possible directly to the product responsible, and this account covers such charges as fieldmen's salaries and expenses when working on behalf of one product at a time. Other crop expenses which cannot be directly allocated are charged to factory overhead.

Loss on Seed or Plants—The canner decides on the varieties to be grown and the proportions of each, and either produces his own seed or purchases it from outside reputable sources. In either case the seed is supplied to the grower, who is usually charged flat rate for it. The price charged the grower is a nominal price only and in most cases does not cover the cost to the canner. Tomato plants may be produced in seedbeds by the company's own crop department or by outside contractors. The plants in turn are supplied to the tomato growers at a fixed price per thousand as provided in the contract. These functions also usually result in a loss to the canner. These losses or expenses on supplying seed and plants to growers are charged to a separate account called Loss on Seed or Plants, which is a direct expense of the resultant product.

Direct Power Plant Expense—Most of the power plant expense can be definitely allocated to a given pack when one product group is packed at a time. Such expenses are coal, water and electricity.

Indirect Product Labour—All extra pack labour which is not direct labour is charged to this account, since it is incurred for a specific pack of one product group only.

Other Direct Expense—Other expenses which are incurred specifically for a given product are charged to this account. This includes direct compensation insurance as well as all other extra pack incidentals.

INDIRECT MANUFACTURING COSTS

The canning industry serves as a very good example in illustrating the general problem of overhead distribution. Within the industry there are many small plants which pack only one product of one size, called a one-line plant. The application of overhead to production is very simple under such a condition. The total indirect expenses divided by the number of cases packed gives the overhead per case. The problem is only slightly more involved where several sizes are packed to one product in a plant. Then it is only necessary to convert the pack to a base size—the size of which there is the greatest pack—and then compute the overhead cost for the total pack of each size on the converted basis. This allocates the

Exhibit 11

Can Usage Statement

Size (oz.)	No. Per Case	Product	1 Cases Packed	2 Absolute Can Usage	3 Inventory Reduction Prorated #	4 Total Actual Wastage No.	4 Total Actual Wastage %	5 Reported Wastage	6 Wastage Unaccounted For	7 Actual Cost # Prorated	8 Standard Cost per 1000 cans	9 Standard Cost of Actual Can Usage	10 Total Standard Cost	11 Variance Due to Quantity	12 Variance Due to Price
10	48	Tomato Juice	1,000	48,000	48,800					90.00					
		Tomato Soup	1,500	72,000	73,200					135.00					
		Total 10 oz.	2,500	120,000	122,000	2,000	1.67	1800	200	225.00	18.00	219.60	218.16	1.44	5.40
15	48	Tomatoes	1,000	48,000	48,450	450	.94	440	10	105.00	21.00	101.75	101.80	.05-	3.25
20	24	Tomato Juice	1,000	24,000	24,200	200	.83	175	25	76.00	29.75	72.00	72.11	.11-	4.00
28	24	Tomatoes	3,000	72,000	72,750	750	1.04	700	50	255.00	35.00	254.63	254.52	.11	.37
48	12	Tomato Juice	500	6,000	6,075	75	1.25	70	05	32.00	48.25	29.31	29.24	.07	2.69
105	6	Tomatoes	1,000	6,000	6,100					50.00					
		Tomato Juice	500	3,000	3,050					25.00					
		Tomato Puree	500	3,000	3,050					25.00					
		Total 105 oz.	2,000	12,000	12,200	200	1.67	160	40	100.00	79.00	96.38	104.28	7.90-	3.62
		Grand Totals	10,000	282,000	285,675	3,675	1.30	3345	330	793.00		773.67	780.11	6.44-	19.33
		Total Variances											12.89	12.89	
										793.00			793.00	19.33	19.33

Prorated over products within each size on basis of absolute usage

Exhibit 12

Standard Cost of Factory Overhead by Producing Departments

Department	Basis of Distrib.	Total	Receiv'g	Peel'g	Insp.	Chopper	Juice Extractor	Pulp	Soup	Can Handle	Hand Pack	Fill & Close	Retort	Case	Stack
Cases Processed		600,000	600,000	300,000	600,000	300,000	180,000	120,000	90,000	600,000	300,000	600,000	570,000	600,000	600,000
Direct Labour Hours (000)		311,000	12,	160,	20	2	2	1	1	20	16	10	12	40	15
Departmental Assets ($)		35,000	2,000	4,000		2,000	1,000	3,000	3,000	1,000	1,000	10,000	5,000	1,000	2,000
Floor Space (sq.ft.)		50,000	500	20,000		1,000	1,000	2,000	2,000		500	8,000	10,000	5,000	
Other Indirect Costs	Labour Hrs.	2,000	77.17	1028.93	128.61	12.86	12.86	6.43	6.43	128.61	102.89	64.30	77.17	257.23	96.51
Factory Supt.	Labour Hrs.	5,000	192.93	2572.35	321.54	32.15	32.15	16.08	16.08	321.54	257.23	160.77	192.93	643.09	241.16
Factory Off.	Labour Hrs.	2,000	77.17	1028.93	128.61	12.86	12.86	6.43	6.43	128.61	102.89	64.30	77.17	257.23	96.51
Lab. & Expt.	Labour Hrs.	1,500	58.06	769.37	96.77	9.68	9.68	4.84	4.84	96.77	77.42	48.39	58.06	193.54	72.58
Power Plant	Direct	2,000											2000.00		
Eng. & Maint.	Dept.Assets	2,000	114.29	228.57		114.29	57.14	171.43	171.43	57.14	57.14	571.43	285.71	57.14	114.29
Auto Truck	Actual	5,000													5000.00
Building Service	Floor Space	10,000	100.00	4000.00		200.00	200.00	400.00	400.00		100.00	1600.00	2000.00	1000.00	
Crop Dept.	Direct	6,000	6000.00												
Other Fixed Charges	Dept.Assets	4,500	257.13	512.26		257.16	128.58	386.71	386.71	128.56	128.56	1285.74	642.87	128.56	257.16
Total Apportioned Deptl. Expense		40,000	6876.75	10140.41	675.53	639.00	453.27	991.92	991.92	861.23	826.13	3794.93	5333.91	2536.79	5878.21
Total Direct Dept. Expense		7,000	500.00	300.00		100.00	100.00	200.00	100.00	100.00	200.00	4500.00	500.00	150.00	250.00
Total Dept. Expense		47,000	7376.75	10440.41	675.53	739.00	553.27	1191.92	1091.92	961.23	1026.13	8294.93	5833.91	2686.79	6128.21
Standard Cost per Reduced Case			.01229	.03491	.00113	.00246	.00307		.00994	.12132	.00160	.00343	.01382	.01023	.00448	.01021

overhead to the various sizes, and the overhead cost per case is obtained by dividing the actual cases packed of each size into the apportioned indirect costs of the size.

Then there is the plant which packs several products, but only one product at a time. For instance, a plant might pack peas and corn, each product requiring to be canned at a different season. All costs that can be charged directly to the individual pack are charged to it, such as coal and labour of power plant, factory supplies, indirect labour which is hired only for the duration of the pack, etc. Since the individual pack has incurred these extra costs, they are charged directly to the pack as direct expense items. The reason for this is the fact that different products may vary largely in their incurrence of indirect charges, so that when only one product is being packed at a time more accurate results can be obtained by segregating the indirect costs by products causing them.

In many plants there are primary and secondary packs. The primary packs are those put up from perishable produce while in season. These constitute the major portion of the yearly pack of canned foods. The location and operation of plants are governed by the primary packs. The secondary packs are those put up during the long winter months when no perishable raw produce is available. These products aid greatly in the absorption of overhead, but the proportion of the total overhead costs that such secondary products should absorb is the subject of varying opinions. Some authorities hold that the secondary products, such as the well-known pork and beans, spaghetti, etc., should carry a portion of the overhead costs, while others do not. Canners sometimes insist that no fixed expense be charged to the secondary products, while others believe that one of the objects of the latter products is to absorb part of the overhead, in fact to absorb the overhead during the period which otherwise the plant would be shut down. George V. Rowntree (10) is of the opinion that the non-seasonal commodities should bear one-third of the fixed charges, although this method would be justified only when the value of the seasonal pack exceeded that of the non-seasonal pack.

Further complications arise in distributing factory indirect costs when two or more product groups are packed simultaneously. A product group constitutes the several commodities that are packed from one raw farm product. For instance, tomatoes, tomato juice, tomato soup ,tomato puree, ketchup, chilisauce are all made from raw tomatoes as the basic raw material and form a product group. Within a product group there is a common factor represented in the pounds of the basic raw material used in all the products. The presence of this common factor facilitates the allocation of factory overehad to the products. However, when more than one product group is packed at one time, from totally dissimilar raw farm produce, the pounds of raw produce cannot be used as a basis of distribution at all for any elements of cost.

Furthermore, under present war conditions restricting the supply of tinplate; the canning of many items is prohibited. This curtailment of operations has lead some canners to seek new fields of food preparation, and to the development of dehydrated food products which can be prepared without the use of the tin can. Such dehydrated products put up in packages instead of cans present a further complication in the allocation

of factory expense to production, since an entirely different set of factors comes into play, involving different utilization of the productive facilities.

Of course the final result desired is to know the cost per case for each product item by elements of cost. Indirect manufacturing costs follow this general plan, when we want to know the factory overhead cost per case for each product item. The whole problem, then, is the equitable allocation of the overhead to products so that the cost per case can be determined. In examining the discussion which follows these two points need to be kept foremost in mind.

Fund Method

Treating indirect costs as a composite fund the creation of which each product has a proportional share, is probably the most popular method of overhead distribution. Its popularity is no doubt due to its simplicity. From this fund charges are made to the various products packed in proportion to (a) the number of cases packed (reduced to base size), (b) the total direct costs (prime cost) or (c) direct labour cost.

Recovery Theory—The actual incidence of overhead costs might be far removed from the amount allocated to any particular product under the fund method. It might be argued that this point matters little, since if we recover all outlay of funds plus a margin of profit, our cost procedure must be functioning properly—hence must be satisfactory. This line of reasoning does not stand up under investigation, because we may recover all costs plus profit in the aggregate at present, but our policy might be heading us for disaster later on. Let us suppose that the above methods showed that product A cost more than it should, and B cost less. There would be a tendency to attempt to increase production of product B because it showed a greater margin of profit by the fund method. Let us further suppose we were actually losing money on B. Then the greater our production on this item the more money we would lose. Also if we priced product A in proportion to our cost figures we could not sell on a highly competitive market, and would lose business, simply because our prices were too high, resulting from faulty cost data which overstated cost of item A.

There is no one right way to allocate such a conglomerate mass under the fund method. The problem can only be solved by breaking the fund up into the logical overhead or burden centres of the plant. If each product received equal attention or work in each producing department, then the fund method would give reliable results, but such is seldom the case. Instead, certain products receive more processing in some departments than others, and even miss certain departments entirely. Indirect costs, therefore, seem to associate themselves around definite cost centres, the producing departments, which may be further grouped into overhead centres.

Cases Packed Method—The distribution of overhead to products in total on the basis of cases packed, all reduced to an equivalent can capacity base size, assumes that overhead charges are proportional to the size of can, regardless of what goes into the can. Thus, a 15-ounce can of tomatoes would bear as much overhead as a 15-ounce can of tomato soup, tomato juice, corn, peas, or any other product put up in the plant, disregarding the varying quantities of raw produce required for the different products. This objection, however, would be eliminated, in a plant which

packs only one product or when the overhead is distributed departmentally. If the actual cases packed is used, we have the additional objection that no consideration is given to the varying can capacity per case in different sizes.

Prime Cost Method—The prime cost method assumes that overhead is proportional to the cost of direct labour and materials, regardless of the identity of the product. Products which carry a higher cost for farm produce will carry a proportionately higher overhead charge. Under some circumstances, this condition may reflect the true incidence of overhead, but under others it may not. Likewise, the labour involved for one product may be considerably less than that for another, and it would be allotted proportionately less overhead costs. If the average rate of wages was fairly constant for the packs of the various products, no unfairness would result; but if a certain product required more higher-priced labour it would have to absorb proportionately more overhead, even though the use of such higher-priced labour did not increase the overhead costs.

Direct Labour Cost Method—The comments in connection with labour in the above paragraph apply under this method. Ralph H. Barr (3) says. "As direct labour is replaced by labour-saving equipment such as peach pitters and pear peelers, under this method the amount of superintendence cost applied is materially reduced without any actual saving in the cost of superintendence . . . The amount of direct labour incurred in packing any variety is not likely to be a fair criterion as to the amount of direct expense incurred."

Direct Labour Hour Method—This method has essentially the same features as the direct labour cost method, except that it is based on the premise that manufacturing overhead varies according to the time spent in production rather than the value of the time in dollars. As its name implies, the direct labour hour method requires data on the hours spent in production in the producing departments. The objections raised in the above paragraph also apply here. This method has a strong supporter in W. B. Lawrence (9).

The Departmental Principle

Overhead Centres—Whether the production centres in any plant are sharply drawn or not, the production of canned foods does divide itself into several distinct functions, processes or departments. Probably 20 per cent of indirect manufacturing costs can be charged directly to the various producing departments when incurred, and probably another 30 per cent can be accurately traced to the respective producing departments. This means that about 50 per cent of the overhead charges can be accurately associated around the various producing departments. Each producing department or production centre has a definite output unit by which the production efficiency of the department can be accurately measured. This means that approximately 50 per cent of the total overhead can be definitely allocated to production on an accurate basis by dividing the departmental overhead by the units produced. This leaves only the remaining 50 per cent to be allocated to the producing departments on an arbitrary basis not so closely related to actual production units. These production centres are known as overhead centres when one or more is used for gathering and distributing overhead. Exhibit 12 gives a horizontal list

of the producing departments packing tomatoes, tomato juice, soup, and puree. In the vertical column are listed the service departments. The following paragraphs are a discussion of the incidence of the service department costs to the overhead centres.

Factory Supervision—General factory supervision is related directly to labour, and it is therefore logical to distribute this cost over the producing departments on the basis of labour hours incurred in those departments. The quantity of supervision seems to be more closely associated with labour hours than labour cost. W. B. Lawrence (9) recommends this method.

Factory Office—The factors involved in factory office expense distribution are the same as those in factory supervision.

Power Plant—Steam is used in sterilizing cans, in the retorts for pressure cooking, in the pulp tanks and heaters, in the scalder, and for clean-up. Water is used largely for the boiler and for clean-up. Electricity is used chiefly as power for motors and for lighting. Without the use of many meters, it is impossible to allocate these costs to the departments using the elements in an accurate manner. More than 20 per cent of the factory overhead would be incurred for power if all power plant expenses were treated as factory overhead. Hence, better results are obtained when all power plant expense incurred during a specific pack is charged as a direct expense of that pack when one product group is canned at a time. This means that the remaining shut-down power plant expense is relatively small. In order that all products will get a share of this cost it is charged to the retort department in full.

Laboratory and Experimental—Since the laboratory services are an agency of control affecting practically all departments, its expense is apportioned over all departments according to direct labour hours. Incidental experimental work is similarly treated. Special experimental work is treated as a direct expense of the product affected wherever practicable.

Engineering and Maintenance—It is difficult to find a simple equitable method of apportioning this type of expense. After transferring any costs in connection with building space to the Building Service, then the remainder is incurred because of machinery. The value of the fixed assets in each department would be a logical basis to use in distributing this expense. The values shown in the fixed asset ledger at the beginning of the year is used for working out a percentage for each producing department.

Auto Truck—The use of auto trucks varies with each canner and plant. The cost, of course, is reduced by any income received for deliveries to customers. The net cost seems to be a fitting charge to the stacking Department, as it will be spread over all products by cases under this method.

Building Service—This departmental expense is intended to collect all expenses related directly to the use of building space. Building space is allocated to the producing departments and the cost is distributed on the basis of the area occupied by each in relation to the total area occupied by the producing departments. The service departments are ignored.

The Crop Department—The crop department is devoted to the procurement of raw farm produce. The fieldmen of this department exercise

careful supervision over the growing crops covered by contract all during the season. All costs of this department, including the salaries and travelling expenses of field men and other incidental expense are charged directly to each crop wherever possible, while the remainder must be apportioned on an arbitrary basis. In the case of tomatoes, however, we have only one crop but several distinct products resulting. For this reason the tomato crop expense must be apportioned to the tomato products. The crop expense is really an addition to the cost of the raw tomatoes received, but for the sake of control and information is kept separate in the accounts.

Other Fixed Charges—These expenses consist of insurance, taxes and depreciation other than on buildings, and is distributed on the basis of departmental assets.

Other Indirect Costs—This covers all miscellaneous expenses not properly chargeable to any particular Service Department, and are apportioned to the production departments on the basis of direct labour hours.

Conversion Factors

The expression of cases packed in terms of a single base size is called converted cases packed. This device is one method of solving the problem of joint costs in the canning industry in so far as varying can content is concerned. This method is accurate as a method of allocating any element of cost to sizes which bears a relation to can size. Conversion factors based on the relative content of the cans making up a case of each size cans are developed. For the purpose of this study we shall use the nominal fluid ounces per can, althought in practice the factors are more accurate.

Exhibit 11A shows each size of can used in this study, the number of cans per case, and the corresponding ounces per case. The 20-ounce size or No. 21 used as the base and equals 1. The other sizes are expressed as ratios of this base size. To illustrate, the content conversion factor for a 15-ounc can is

$$\frac{\text{(ounces base size)}\quad 480}{\text{(ounces size to be converted)}\quad 720} = 0.66666 \left\{ \begin{array}{l} \text{(Control} \\ \text{Conversion} \\ \text{Ratio)} \end{array} \right.$$

Thus, 10,000 cases of 28-ounce tomatoes is equivalent in can content to 7142.8 cases of 20-ounce, obtained by multiplying 10,000 cases by the conversion ratio of .71428. Conversely, if we have the total cases expressed as the converted size, to obtain the equivalent cases of 28-ounce, we must divide the converted size cases by the conversion ratio.

Exhibit 11A

Can Content Conversion Factors

Size	No. Cans per Case	Total Ounces per Case	Content Conversion Factor
10 oz.	18	480	1.00000
15 oz.	48	720	0.66666
20 oz.	24	480	1.00000
28 oz.	24	672	0.71428
48 oz.	12	576	0.83333
105 oz.	6	630	0.76190

Standard Overhead Costs

The Pack Forecast—The most difficult problem in establishing stand-

ard costs of overhead is estimating the pack. A short time before the commencement of canning operations at a plant, the field department submit their final pre-pack estimate on the yield and quality of raw produce. This information is studied in the light of past history and the anticipated manufacturing conditions. Where several product groups are packed at a plant, this must be done for each group, and a complete estimate of the seasonal pack by product item set up. If non-seasonal items are to be packed as well, an estimate of these items is also required. The latter pack depends largely on the prospective marketing conditions, while the seasonal pack depends largely on the weather conditions throughout the season. For these reasons the size of the annual pack cannot be accurately predetermined, and not even closely predetermined, except under conditions of restricted operations. Because of the fact that the size of the seasonal pack is not known until it is over it is impractical to prepare a variable budget for the canning industry. Therefore, only one pre-pack estimate on production is made, since it cannot be revised with much accuracy during the pack. The overhead budget is therefore prepared on the basis of a single forecasted pack. We are assuming the forecasted pack for purposes of this study expressed in terms of the base or converted size (No. 2 size), as shown in Exhibit 12.

Budgeting Departmental Expense—A budget sheet is set up for the producing and service departments, broken down by labour, materials, repairs, expense, as well as for fixed charges. The estimated expense is entered in detail for a pack of 600,000 converted cases. The budgeted overhead is based on previous experience in relation to prospective manufacturing conditions such as wage rates, prices, etc.

Distribution of Service Department Costs—The final budgeted expense for each producing and service department are entered on the overhead distribution work-sheet, Exhibit 12, Service department costs are distributed directly to the producing departments as discussed in the previous section. The services performed to the other service departments by each service department are ignored, since the net result would not be significantly altered. Lawrence (9) suggests this method is acceptable when results are similar to applying service department costs to other service department costs in the order of greatest services.

Distribution Bases—The direct labour hours is obtained largely from past experience. The departmental assets figures for each department reflects the values of all fixed assets in the departments except building space. The floor space for the several producing departments is totalled to give the total floor space ignoring the floor space of the service departments, since the floor space occupied by the service departments is negligible.

Standard Overhead Cost per Case—The service department costs are all distributed over the producing departments and the total apportioned expense of each producing department is shown, to which is added the direct expense of each producing department, giving the total budgeted expense of each producing department. The flow sheet in Exhibit 2 shows the departments through which each product passes, enabling us to compute the total number of converted cases budgeted for each department. The total budgeted departmental expense divided by the budgeted number of converted cases for the department gives the departmental cost per case

for indirect manufacturing expense. These departmental figures are compiled on a sheet shown in Exhibit 13 and totalled for each product to give the total overhead cost per converted case. To obtain the standard or budget overhead cost per case say of 48-ounce the standard cost per converted case is divided by the conversion factor for 48-ounce size to get the standard cost for this size. For example, the standard cost of 20-ounce (converted size) is .05929, which when divided by .83333 (Exhibit 11A), gives .07115 per case.

Theoretically the total cost of each production department should be divided by the output unit of each department to get the cost per departmenal output unit. Then the cost per departmental output unit is multiplied by the standard departmental output units per case to get the standard cost per case in each department. In actual practice, however, substantially similar results are obtained by simply dividing the number of converted cases packed from the output of each department into the total cost to arrive at the cost per case.

The use of production as a basis for distributing factory overhead is not satisfactory when the fund method is used. But when the overhead is suitably departmentalized, it gives direct and accurate results for those departments processing the raw produce, from Receiving to the Soup Departments. In those departments handling cans and cases, the distribution on the basis of converted cases packed is not so accurate, but still it gives just as satisfactory results as any other method, since the same method must be used in all departments.

T. W. Tull (11) illustrates and discusses the departmental principle of distributing factory overhead used in his plant. He uses the gallonage packed in each department as the basis for distributing the departmental overhead to production, which is essentially similar to the converted cases packed illustrated in this paper. No other literature on canning costs indicates that the departmental method is used in the industry.

Actual Overhead Costs and Variances

The Actual indirect manufacturing costs are compiled in precisely the same manner as standard overheads costs, as shown in Exhibits 12 and 13, and then converted to individual sizes. After the seasonal pack the standards can be revised if there is substantial variance in the actual from standard. If not, then they remain until the end of the year. At that time the variance from standard is charged to profit and loss if it would not significantly affect the unit cost of production. If it would, then the variances are apportioned back over the production of the year. The latter is not resorted to unless absolutely necessary.

A separate subledger is maintained for the indirect manufacturing costs of each plant. In each ledger a separate account is kept for each element of expense (labour, supplies, repairs, depreciation, etc.) for each production and service department. This breakdown of overhead costs provides the required information for the departmental budget and control of departmental expense.

(Ed. Note: It was found necessary to publish this article in three parts instead of two. Part III will appear in the next issue).

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